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J. Lamb / 1034A

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INTER-COMPANY CORRESPONDENCE

UNION CARBIDE NUCLEAR COMPANY

Division of Union Carbide Corporation

To: Mr. H. G. P. Snyder
K-303-7

Plant: Oak Ridge Gaseous Diffusion

Date: February 24, 1958

Copies To: Mr. K. W. Bahler, Mr. R. C. Baker, Mr. R. M. Batch, Mr. E. C. Bollinger, Dr. A. D. Callihan, Mr. R. H. Dyer, Mr. J. M. Ellis, Mr. L. B. Emlet, Dr. G. A. Garrett, Dr. H. F. Henry-RC, Mr. A. P. Huber, Mr. K. M. Jones, Mr. R. G. Jordan, Mr. D. M. Lang, Dr. R. L. Macklin, Mr. J. A. Marshall, Mr. J. D. McLendon, Mr. R. L. Newton, Mr. J. A. Parsons, Mr. W. L. Richardson, Mr. M. F. Schwenn, Mr. E. O. Sternberg, Mr. B. H. Thompson

Subject: UF_6 Release Control, K-33 Feed Room

KSA-124

Nuclear safety considerations have been given to a request to use steam, which will be manually controlled, as a means of quickly disposing of UF_6 fog from the atmosphere in event of releases in the K-33 feed room so that appropriate action may be initiated to correct the difficulty.[1,2] Steam was recently used at this location for the control of a normal U-235 assay release and proved highly effective in the rapid removal of UF_6 from the atmosphere. The estimated maximum U-235 assay of the UF_6 which will be processed in the K-33 feed room is 2%.[3]

Nuclear Safety

Although an operator is normally in attendance at the K-33 feed facility, both the feed furnaces and the pipe enclosures are monitored at 16-minute intervals by 2 automatic UF_6 release detectors which have audible and visual alarm circuits in both the feed room and the K-33 control room and which, in event of a release, will also automatically shut off the feed to the cascade; thus, the principal hazards of nuclear safety concern are the possibility of an unsafe accumulation of uranium within the feed room and of increased moderation in the feed cylinders, which are considered nuclearly safe only under conditions of moderation control.

Nearly all the releases which have occurred to date at this facility have been at the cylinder connection to the feed headers, and have been not only infrequent but also of small extent. However, major releases have

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1 Letter to H. F. Henry from R. L. Newton, K-33 Feed Room, 1-17-58
2 Henry, H. F., Cascade Feed and Withdrawal Facilities - Special Hazards Summary - Revision No. 1, 10-31-56, (KSA-64)
3 Hanig, M., K-25 Plant Assays, 7-11-53, (KD-708)

occurred, and there still exists the possibility of such incidents as a result either of cylinder rupture or broken lines. Even in the event of a major release, it is unlikely that the safe slab depth of 8.7"[4] for the assay concerned would be exceeded at any location since the UF_6 would be dissipated throughout the room by the room ventilation system, and the resulting UO_2F_2 fall out would be deposited over a large area. Further, the monitoring system appears adequate to detect UF_6 releases readily and, as indicated by test, any UF_6 released to the atmosphere will be removed rapidly after the steam is applied, thus enabling the operator to locate and correct the cause quickly.

It should be specifically noted, however, that the nuclear safety of the feed cylinders depends upon moderation control and thus the steam nozzles, either from a hose line or a fixed manifold, should not be positioned so that steam can be sprayed directly on the cylinder at any time. In the case of fixed manifolds, the positions of the steam nozzles will be periodically checked by area supervision and any nozzles whose positions may have become altered will be repositioned as specified; the handling requirements for the hose lines will be covered in written instructions to operating personnel. Further, during subsequent clean-up operations, containers which are geometrically safe for the U-235 assay concerned should be used.

Conclusion

The use of steam for the removal of UF_6 from the atmosphere in event of releases in the K-33 feed room appears safe provided:

1. Steam manifold or hose nozzles are positioned so that steam is not sprayed directly on the feed cylinders.

2. Containers which are safe for the U-235 assay concerned are used in clean-up operations.

H. F. Henry
Safety, Fire, and Radiation Control

W. A. Pryor:AJM:vr

4 Callihan, A. D., Garrett, G. A., Henry, H. F., and Macklin, R. L., Recommended ORGDP Criteria for U-235 Assay Materials Below 5.0%, 1-30-58, (KSA-113)